

CLAIMS:

1. Optical element, provided with a receiving plane (10) comprising a receiving section (11) for receiving at least one light beam (2), wherein the receiving plane (10) is provided with at least one light-detection element (3) being arranged to detect whether at least part of said light beam is projected thereon.
- 5 2. Optical element according to claim 1, wherein the at least one light-detection element (3) is arranged adjacent said receiving section (11).
- 10 3. Optical element according to claim 1 or 2, wherein the at least one detection element (3) comprises material whose electric resistance changes when light of said light beam (2) is projected thereon, wherein said detection element (3) is arranged to be connected to an electrical measurement device.
- 15 4. Optical element according to any one of the preceding claims, wherein the at least one light-detection element (3) substantially surrounds at least part of said light receiving section (11) of the receiving plane (10).
- 20 5. Optical element according to claim 4, wherein the at least one detection element (3) is a substantially ring-shaped.
6. Optical element according to claim 4 or 5, wherein said light receiving section, which is at least partially surrounded by said detection element (3), is only slightly larger than the cross-section of said light beam (2) viewed in said receiving plane (10).
- 25 7. Optical element according to any one of the preceding claims, wherein said at least one detection element (3) is arranged symmetrically with respect to said light-receiving section (11).

8. Optical element according to any one of the preceding claims, wherein said receiving plane (10) is provided with at least two spaced apart light-detection elements (3).

9. Optical element according to claim 8, wherein the distance between the at least two detection elements (3) is slightly larger than the diameter of said light beam (2), said diameter being measured in said receiving plane (10).

10. Optical element according to claim 9, wherein the difference between said distance and said light beam diameter is less than about 1 mm.

11. Optical element according to claim 9, wherein the difference between said distance and said light beam diameter is less than about 1 μm .

12. Optical element according to any one of the preceding claims, wherein the optical element (1) has been provided with the at least one light-detection element (3) using at least one thin layer deposition technique, for example CVD, PE-CVD, MBE, sputtering and/or evaporation.

13. Optical element according to any one of the preceding claims, wherein the at least one light-detection element (3) has a thickness, measured perpendicularly to said light receiving plane (x,y), of about 100 μm or less.

14. Optical element according to claim 13, wherein said thickness is about 1 μm or less.

15. Optical element according to claim 14, wherein said thickness is about 100 nm or less.

16. Optical element according to any one of the preceding claims, wherein each light-detection element (3) has a width (W), measured in said light receiving plane (10), of about 1 mm or less

17. Optical element according to claim 16, wherein said width (W) is smaller than about 100 μm .

18. Optical element according to claim 16, wherein said width (W) is smaller than about 1 μm .

5 19. Optical element according to any one of the preceding claims, wherein each light-detection element (3) has a volume of less than about 10,000 μm^3 .

20. Optical element according to any one of the preceding claims, wherein the at least one light-detection element (3) comprises at least one electrically conductive material,
10 for instance a metal.

21. Optical element according to any one of the preceding claims, wherein the at least one light-detection element (3) comprises at least one thermocouple.

15 22. Optical element according to any one of the preceding claims, wherein the optical element (1) comprises electrical connections (4) which are connected to the at least one light-detection element (3) to connect said detection element to a measurement device.

23. Optical element according to at least claim 3, wherein different parts of each
20 light detection element (3) are arranged to be connected to an electrical measurement device.

24. Optical element according to at least claim 1, wherein the at least one detection element (3) extends at least partially within said receiving section (11).

25 25. Optical element according to claim 24, wherein the at least one light-detection element (3) is arranged to provide an optical grating.

26. Optical element according to any one of the preceding claims, wherein the optical element (1) comprises a lens.

30 27. Optical element according to any one of the preceding claims, wherein the optical element (1) comprises an optical filter.

28. Optical element according to any one of the preceding claims, wherein the optical element (1) comprises an optical grating.

29. Optical element according to any one of the preceding claims, wherein the optical element (1) comprises a mirror.

30. Method of manufacturing an optical element, wherein an optical element substrate is provided with the at least one light-detection element (3) using at least one thin layer deposition technique.

31. Method of aligning at least one light beam and an optical element according to any one of the claims 1 to 29, wherein the light beam (2) is projected onto said optical element (1), such that the optical element (1) receives the light beam (2) in said receiving plane (10), wherein the at least one light-detection element (3) is used to align the optical element (1) and the light beam (2) such, that the optical element substantially receives the light beam (2) in the receiving section (11) of the receiving plane (10).

32. Method according to claim 31, wherein the light beam (2) and the optical element (1) are moved from a first relative position in which the light beam (2) is detected by the at least one light-detecting element (3), to a second relative position in which the light beam (2) is substantially not detected by said detecting element (3).

33. Method according to claim 32, wherein subsequently the light beam (2) and the optical element (1) are moved to a third relative position in which the light beam (2) is detected again by the at least one light-detecting element (3) and/or by a further light-detecting element (3), wherein a final relative position of the light beam and the optical element (1) is determined using the detection results obtained for the first, second and third relative positions.

34. Method according to any one of claims 31-33, characterized that the at least one light beam and the optical element (1) are aligned on an optical axis.

35. Method according to at least claims 3 and 31, wherein said use of the at least one detection element (3) comprises measuring its resistance to detect whether at least part of the light beam is projected thereon.

5 36. Method according to claim 35, wherein, when a certain temperature rise of the at least one detection element (3) is detected, the light beam (2) and the optical element are moved with respect to each other such that the temperature of said detection element (3) falls.

10 37. An optical device for recording and/or reproducing information on/from an information layer of a rotatable optical disc, which device comprises the optical element according to any one of the preceding claims 1 to 29.